

Remarks

Reconsideration of the present amendment, as amended, is respectfully requested.

Of previously pending claims 1-25, all were rejected. Claims 1-6, 11-13, 16, 17, 22, and 23 were rejected under 35 U.S.C. §103(a) as being obvious over previously cited U.S. Patent No. 5,436,750, which issued July 25, 1995 to T. Kawano, in view of U.S. Publication No. 2002/0138796, filed March 23, 2001 by J.M. Jacob. Claims 7-10, 14, 15, and 18-20 were rejected under 35 U.S.C. §103(a) as being obvious over the cited Kawano patent in view of the Jacob patent application and previously cited U.S. Patent No. 6,204,959, which issued March 20, 2001 to Fujita et al. Claims 24 and 25 were rejected under 35 U.S.C. §103(a) as being obvious over the cited Kawano patent in view of the Jacob patent application and further in view of the previously cited U.S. Patent No. 6,515,967, which issued Feb. 4, 2004 to Wei et al.

With due respect to the Examiner, these rejections are mistaken. The applicants address the Examiner's rejections with respect to independent claims 1, 6, 12, 17, and 22-25 which have been amended to better point out the applicants' invention with particularity and for consistency of language. Dependent claims 2-4, 7-8, 11, 14, 16-18, and 21 have also been amended to reflect the changes to their corresponding base claims and to correct some possibly vague language.

The Examiner's reliance upon the Kawano patent to reject the applicants' claims is misplaced. The repeatered optical transmission system of Kawano sends a data signal and a supervisory signal from one terminal station T1 to a second terminal station T2. See Fig. 1. As the combined, i.e., multiplexed, data signal and supervisory signal travel from T1 to T2, successive repeater stations R1-Rn check "for the presence or absence of the supervisory signal. The presence of the supervisory signal indicates that there is no failure in the system." Col. 4, lines 3-6. The data signal is digitally encoded at frequency f_s . Col. 4, lines 24-25. For the supervisory signal, "[a]n oscillator 22 is provided for generating a constant amplitude sinusoidal signal at frequency f_0 . This signal is applied as the supervisory signal to the other input of the differential amplifier where it is compared with the laser output to produce a difference signal....In this manner, negative feedback operation is performed and the amplitude of the data

signal is modulated with the supervisory signal at the modulation index of typically 10% as illustrated in Fig. 4.” Col. 4, lines 32-42. See especially Fig. 4B and 4C.

Thus it is readily evident that the Kawano patent does not render the applicants’ claimed invention obvious. For example, independent claim 1 calls for:

- A method for monitoring performance of an optical communication link, said method comprising:
 - at a first intermediate location along said link, separating a portion of an optical data signal traveling along said link to form a first measurement optical signal;
 - detecting said first measurement optical signal to form a first measurement electrical signal; and
 - performing error correction decoding on said first measurement electrical signal to generate an indication of correct receipt of data at said first intermediate location based on a number of detected errors in the data.

In rejecting independent claim 1, the Examiner stated, “...Kawano discloses optical repeater transmission system comprising:...detecting said first measurement optical signal to form a first measurement electrical signal (photodiode (42) detect the first measurement optical signal and form a first electrical signal); and detecting said first measurement electrical signal to generate an indication of correct receipt of data at said first intermediate location (the circuitries in the repeater system decode the measured signal and obtained the indication of correct receipt of data which is the supervisory signal; based on the reception of such signal, failure occurrence can be determined; see col. 2, lines 37-55 and col. 4, lines 10-15).” The applicants understand this quoted portion to mean that the Examiner understands the supervisory signal to be the applicants’ optical data signal to meet the language of claim 1, to wit, a portion of an “optical data signal traveling along said link” forms “a first measurement optical signal,” which is detected “to form a first measurement electrical signal” from which an indication of correct receipt of data is generated.

However, the claim calls for an optical data signal. The supervisory signal, “a constant amplitude sinusoidal signal at frequency f_0 ,” is not a data signal. Secondly, claim 1 calls for the generation of “an indication of correct receipt of data at said first intermediate location based on a number of detected errors in the data.” How can “the presence or absence of the supervisory signal” indicate the number of detected errors in the data? Either the supervisory signal is detected or not.

Thirdly, the Examiner states, “Kawano disclose receiver for detecting the optical signal and differs from the claimed invention in that Kawano does not disclose performing error correction decoding on said first measurement electrical signal based on a number of detected error in the data. Jacob is cited to show FEC decoder and detecting number of errors (see paragraph [007], [008] and [0022]. Therefore it would have been obvious...to provide the decoder at the receiver of Kawano in order to detect number of errors as taught by Jacob. One of ordinary skill in the part would have been motivated to do this in order to isolate and distinct [sic] faults and reconstruct the received signal.” The Examiner does not explain why a person skilled in the art would encode the supervisory signal whose simple absence or presence indicates whether the system has failed or not.

Finally, the Examiner does not explain how a person skilled in the art would encode the supervisory signal with an FEC encoder. Such encoders work with digital data and the supervisory signal is a simple sinusoid signal of constant amplitude. See Fig. 4B.

Hence it is evident that claim 1 is not obvious over the cited Kawano and Jacob patents and should be allowed. Dependent claims 2-5 should be allowable for at least being dependent upon an allowable base claim.

Independent claim 6 calls for:

Apparatus for monitoring performance of an optical communication link at an intermediate location along said link, said apparatus comprising:
a coupler that separates a portion of an optical data signal traveling along said link;
an optical receiver that recovers data based on said portion of said optical data signal;
an error correction decoding circuit that identifies a number of detected errors in receipt of said data; and
a link verification stage that generates an indication of link operation based on errors identified by said error correction decoding circuit.

In rejecting independent claim 6, the Examiner stated that “...Kawano disclose monitoring performance of an optical communication link at an intermediate location along said link, said apparatus comprising: ...an optical receiver (PD) that recovers data based on said portion of said optical signal; receiver that identifies errors in receipt of said data; and a link verification stage that generates an indication of link operation based on errors identified by said error correction decoding circuit A (see col. 4, lines 10-21 and col. 5, lines 38-51; Kawano discloses that the

circuitries in repeater (R2) check for indication of supervisory signal and based on that location fault can be determined). Kawano disclose receiver for detecting the optical signal and differs from the claimed invention in that Kawano does not disclose performing error correction decoding that identifies a number of detected errors in the data. Jacob is cited to show FEC decoder and detecting number of errors (see paragraph [007], [008] and [0022]. Therefore it would have been obvious...to provide the decoder at the receiver of Kawano in order to detect number of errors as taught by Jacob. One of ordinary skill in the part would have been motivated to do this in order to isolate and distinct [sic] faults and reconstruct the received signal.”

As pointed out previously, the claim recites “an optical data signal,” which is not Kawano’s simple sinusoidal supervisory signal. Secondly, the putative optical receiver, the peak detector (PD) 42 of Fig. 5 does not recover “data based on said portion of said optical data signal.” Rather the peak detector 42, which receives the output of the bandpass filter 41 with a passband centered at the frequency f_0 of the supervisory signal (col. 5, lines 8-10), checks for the presence of that signal. There is no data in a simple sinusoidal signal. Thirdly, the “number of detected errors in receipt of said data” is called for in the claim. As pointed out previously, how the number of errors in receipt of said data is identified from the presence or absence of a simple signal is not explained. Fourthly and finally, equally unexplained are why one skilled in the art would encode a simple sinusoidal signal and how one skilled in the art would encode such a signal.

Hence independent claim 6 is not obvious over the cited Kawano and Jacob patents and should be allowed. Claims 7-11 should also be allowable at least for being dependent upon an allowable base claim.

Independent claim 12 recites:

A system for locating a fault along an optical communication link, said system comprising:
a first link monitor that monitors performance of said link at a first intermediate location along said link; and
a second link monitor that monitors performance of said link at a second intermediate location along said link; and
wherein each of said first link monitor and said second link monitor comprise:

a coupler that separates a portion of an optical data signal traveling along said link;
an optical receiver that recovers data based on said portion of said optical data signal;
an error correction decoding circuit that identifies errors in receipt of said data; and
a link verification stage that generates an indication of link operation based on a number of errors detected by said error correction decoding circuit.

The rejection of claim 12 suffers from the same infirmities as noted above. First, the first and second link monitors of the claim operate on an optical data signal. The Examiner stated that “circuitries in repeater (“R2) check for indication of supervisory signal.” The supervisory signal is not a data signal. Secondly, claim 12 calls for “an optical receiver that recovers data based on said portion of said optical data signal.” The Examiner stated that “an optical receiver (circuitries within R1)...recovers data based on said portion of said optical signal.” This optical signal is the supervisory signal and how data is recovered from a simple sinusoidal signal is not unexplained and, in fact, is not possible. Thirdly, the claim has language of “an indication of link operation based on a number of errors detected.” No number of errors is indicated from the Kawano supervisory signal, the putative optical data signal, whose presence or absence is used to determine system operation. While “0” or “1” are numbers, they are not indicative of the number of errors as called for in the claim. Fourthly, the Examiner reasons, “Jacob is cited to show FEC decoder and detecting number of errors (see paragraph [007], [008] and [0022]. Therefore it would have been obvious...to provide decoder at the receiver of Kawano in order to detect number of errors as taught by Jacob.” No explanation is made why one skilled in the art would encode the supervisory signal, or how one skilled in the art would perform the encoding of a simple sinusoidal signal, the final point in the applicants’ arguments.

Hence claim 12 is not obvious over the cited Kawano and Jacob patents and should be allowed. Dependent claims 13-16 are allowable at least for being dependent upon an allowable base claim.

Independent claim 17 reads:

Apparatus for monitoring performance of an optical communication link at an intermediate location along said link, said apparatus comprising:

means for separating a portion of an optical data signal traveling along said link;
means for recovering data based on said portion of said optical data signal;
means for identifying errors in receipt of said data; and
means for generating an indication of link operation based on a number of errors detected by said error identifying means.

With respect to the rejection of claim 17, the Examiner cited col. 2, lines 43-46 and col. 6, lines 56-66 of the Kawano patent as teaching the applicants' claimed "means for recovering data...". With due respect to the Examiner, the cited portions describe a terminal of the link, specifically the downstream stream terminal T2 of Figs. 1 and 2. On the other hand, what is claimed in independent claim 17 is an "[a]pparatus for monitoring performance of an optical communication link at an intermediate location along said link (underlining added)." The cited portions of the Kawano patent are inapposite to claim 17 and do not anticipate the applicants' claimed invention.

Furthermore, the arguments made previously by the applicants still apply. First, the claim recites an optical data signal. The supervisory signal of Kawano is not a data signal. Secondly, since the supervisory signal is not a data signal, data cannot be recovered from it as called for in the claim. Thirdly, claim 17 has a "means for generating an indication of link operation based on a number of errors detected by said error identifying means (underlining added)," not "generating an indication of link operation based on errors detected by said error identifying means..." As pointed out above, the Kawano patent indicates indication of system operation by the supervisory signal's presence or absence, not the number of errors in the signal. Fourthly and fifthly, the Examiner states that "it would have been obvious to an artisan of ordinary skill in the art...to modify the receiver of Kawano in order to detect number of errors as taught by Jacob. One of ordinary skill would have been motivated to do this in order to isolate and distinct [sic] faults." Again, why and how one would go about FEC encoding a simple sinusoidal signal is unexplained.

Independent claim 17 is not obvious over the cited Kawano and Jacob patents and should be allowed. Dependent claims 18-21 are allowable for at least being dependent upon an allowable base claim.

Independent claims 22 and 23 recite:

22. A method for locating a fault on an optical link, said method comprising:
receiving indications of whether an optical data signal is received successfully from a plurality of monitor locations along an optical link based on a number of errors detected at each monitor location; and
determining a location of said fault to be beyond a last monitor location receiving said optical data signal successfully.

23. Apparatus for locating a fault on an optical link, said apparatus comprising:
means for receiving indications of whether an optical data signal is received successfully from a plurality of monitor locations along an optical link based on a number of errors detected at each monitor location; and
means for determining a location of said fault to be beyond a last monitor location receiving said optical data signal successfully.

Both claims recite the reception of “indications of whether an optical data signal is received successfully from a plurality of monitor locations along an optical link based on a number of errors detected at each monitor location.” The Examiner stated, “Kawano discloses means for receiving...and differs from claimed invention in that Kawano does not disclose receiver to received faults indication based on a number of errors detected at each monitor location. Jacob is cited to show performance monitoring by detecting number of errors (see paragraph [007], [008]). Therefore it would have been obvious...to provide the receiver of Kawano in order to detect number of errors as taught by Jacob. One of ordinary skill in the art would have been motivated to do this in order to isolate and distinct [sic] faults.” Again, the applicants point out that why and how a person in the art would or could perform FEC encoding on the simple sinusoidal supervisory signal of the Kawano patent is unexplained. Claims 22 and 23 are not obvious over the cited Kawano and Jacob patent and should be allowed.

Independent claims 24 and 25 read:

24. A computer program product for locating a fault on an optical link, said product comprising:
code that causes reception of indications of whether an optical data signal is received successfully from a plurality of monitor locations along an optical link based on a number of errors detected at each monitor location;
code that causes a location of said fault to be determined to be beyond a last monitor location receiving said optical data signal successfully; and
a computer-readable storage medium that stores the codes.

25. Apparatus for locating a fault on an optical link, said apparatus comprising:

a processor that executes instructions;
a computer-readable storage medium that stores said instructions, said instructions comprising:
code that causes reception of indications of whether optical data signal is received successfully from a plurality of monitor locations along an optical link based on a number of errors detected at each monitor location; and
code that causes a location of said fault to be determined to be beyond a last monitor location receiving said optical data signal successfully.

In rejecting these claims, the Examiner reasoned, “Kawano discloses means for detecting error and determining faults and differs from the claimed invention in that Kawano does not disclose detecting number of errors at each monitor locations. Jacob is cited to show codes for detecting number of errors (see paragraph [007], [008], [0021] and [0022]). Therefore it would have been obvious...to provide codes to the receiver of Kawano in order to detect number of errors as taught by Jacob. One of ordinary skill in the art would have been motivated to do this in order to isolate and distinct [sic] faults.” Once again, the applicants point out that why and how a person in the art would or could perform FEC encoding on the simple sinusoidal supervisory signal of the Kawano patent is unexplained. Claims 24 and 25 are not obvious over the cited Kawano and Jacob patent and should be allowed.

In summary, independent claims 1, 6, 12, 17, and 22-25 are all allowable. Dependent claims 2-5, 7-11, 13-16, and 18-21 should also be allowable for at least being dependent upon allowable base claims.

Therefore, in view of the amendments above and the remarks directed thereto, the applicants request that all rejections be removed, that claims 1-25 be allowed, and the case be passed to issue. If a telephone conference would in any way expedite the prosecution of the application, the Examiner is asked to call the undersigned at (408) 868-4088.

Respectfully submitted,

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